

WHAT IS CLAIMED IS:

1. A pointing device for detecting a slid distance and a slid direction of an operation key located approximately at the center of an opening section to generate a control signal according to the detected slid distance and the slid direction, wherein:

5 when an original point is defined as a point where a slid distance of the operation key is zero, and a maximum value and a minimum value are defined as `max_max` and `min_max`, respectively, in the state where the operation key is moved until reaching the rim of the opening section, the pointing device generates the control signal
10 corresponding to the slid distance of the operation key by:

determining a strength of the control signal as zero in the case where the operation key is located within a circular area whose center is located at the original point and whose radius is n/N of the `max_max` (n and N are arbitrary positive integers, and $n < N$);

15 determining a strength of the control signal corresponding to the slid distance of the operation key on the basis of a predetermined rule of operation in the case where the operation key is located within a toric area whose distance from the original point is larger than n/N of the `max_max` and smaller than the `min_max`; or

20 determining a strength of the control signal corresponding to a strength obtained when a slid distance of the operation key is the `min_max` in the case where the operation key is located within an area whose distance from the original point is larger than the `min_max`.

2. A pointing device as claimed in claim 1, comprising a plurality of rules of operations for transforming the slid distance of the operation key into the strength of the control signal.

3. A pointing device as claimed in claim 1, wherein:

the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the strength of the control signal to the slid distance of the operation key.

4. A pointing device as claimed in claim 2, wherein:

the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the strength of the control signal to the slid distance of the operation key.

5. A pointing device for detecting a slid distance and a slid direction of an operation key located approximately at the center of an opening section, generating signal strength information on the basis of the slid distance of the operation key, and generating a control signal 5 corresponding to the signal strength information and the slid direction of the operation key, wherein:

when an original point is defined as a point where a slid distance of the operation key is zero, and a maximum value and a minimum value are defined as `max_max` and `min_max`, respectively, in 10 the state where the operation key is moved until reaching the rim of the opening section, the pointing device generates:

15 signal strength information for determining a strength of the control signal as zero in the case where the operation key is located within a circular area whose center is located at the original point and whose radius is n/N of the `max_max` (n and N are arbitrary positive integers, and $n < N$);

signal strength information on the basis of a predetermined rule of operation so that a strength of the control signal corresponds to the slid distance of the operation key in the case where the 20 operation key is located within a toric area whose distance from the original point is larger than n/N of the max _max and smaller than the min _max; or

signal strength information for determining a strength of the control signal so as to be identical to the strength when a slid distance 25 of the operation key is the min _max in the case where the operation key is located within an area whose distance from the original point is larger than the min _max; and

a strength of the control signal is fixed regardless of a slid direction of the operation key when the operation key is located at the 30 position where a distance from the original point is the min _max.

6. A pointing device as claimed in claim 5, comprising a plurality of rules of operations for transforming the slid distance of the operation key into the signal strength information.

7. A pointing device as claimed in claim 5, wherein:
the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the signal strength information to the slid distance of the operation key.

8. A pointing device as claimed in claim 6, wherein:
the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the signal strength information to the slid distance of the operation key.

9. A pointing device as claimed in claim 1, further comprising:
a section for measuring a temperature of an environment where the pointing device is used; and
a section for correcting the detected slid distance of the 5 operation key according to the temperature.

10. A pointing device as claimed in claim 2, further comprising:
a section for measuring a temperature of an environment where the pointing device is used; and
5 a section for correcting the detected slid distance of the operation key according to the temperature.

11. A pointing device as claimed in claim 3, further comprising:
a section for measuring a temperature of an environment where the pointing device is used; and
5 a section for correcting the detected slid distance of the operation key according to the temperature.

12. A pointing device as claimed in claim 4, further comprising:
a section for measuring a temperature of an environment where the pointing device is used; and
5 a section for correcting the detected slid distance of the operation key according to the temperature.

13. A pointing device as claimed in claim 5, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

14. A pointing device as claimed in claim 6, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

15. A pointing device as claimed in claim 7, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

16. A pointing device as claimed in claim 8, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

17. A pointing device as claimed in claim 1, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and $m < N$).

18. A pointing device as claimed in claim 2, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and $m < N$).

19. A pointing device as claimed in claim 3, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and $m < N$).

20. A pointing device as claimed in claim 4, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key

detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max_max (m is an arbitrary positive integer, and $m < N$).

21. A pointing device as claimed in claim 5, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max_max (m is an arbitrary positive integer, and $m < N$).

22. A pointing device as claimed in claim 6, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max_max (m is an arbitrary positive integer, and $m < N$).

23. A pointing device as claimed in claim 7, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max_max (m is an arbitrary positive integer, and $m < N$).

24. A pointing device as claimed in claim 8, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and $m < N$).

25. A pointing device as claimed in claim 1, wherein:

the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

26. A pointing device as claimed in claim 2, wherein:

the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

27. A pointing device as claimed in claim 3, wherein:

the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

28. A pointing device as claimed in claim 4, wherein:
the operation key is provided with a plurality of hall elements
in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid
distance of the operation key on the basis of magnetic flux density
detected by the respective hall elements.

29. A pointing device as claimed in claim 5, wherein:
the operation key is provided with a plurality of hall elements
in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid
distance of the operation key on the basis of magnetic flux density
detected by the respective hall elements.

30. A pointing device as claimed in claim 6, wherein:
the operation key is provided with a plurality of hall elements
in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid
distance of the operation key on the basis of magnetic flux density
detected by the respective hall elements.

31. A pointing device as claimed in claim 7, wherein:
the operation key is provided with a plurality of hall elements
in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid
distance of the operation key on the basis of magnetic flux density
detected by the respective hall elements.

32. A pointing device as claimed in claim 8, wherein:

the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

33. A pointing device as claimed in claim 1, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid 5 distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for the control signal.

34. A pointing device as claimed in claim 2, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid 5 distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for the control signal.

35. A pointing device as claimed in claim 3, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid 5 distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for the control signal.

36. A pointing device as claimed in claim 4, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid 5 distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for the control signal.

37. A pointing device as claimed in claim 5, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid 5 distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for the control signal.

38. A pointing device as claimed in claim 6, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid 5 distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for the control signal.

39. A pointing device as claimed in claim 7, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid 5 distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for

the control signal.

40. A pointing device as claimed in claim 8, wherein:

when the slid distance and the slid direction of the operation key is expressed in a coordinate system different from a coordinate system used for a control signal, the pointing device converts the slid distance and the slid direction of the operation key into a slid distance and a slid direction expressed in the same coordinate system as used for the control signal.

41. An electronic apparatus comprising a pointing device for detecting a slid distance and a slid direction of an operation key located approximately at the center of an opening section to generate a control signal according to the detected slid distance and the slid direction, and a display section for displaying information, wherein:

when an original point is defined as a point where a slid distance of the operation key is zero, and a maximum value and a minimum value are defined as `max_max` and `min_max`, respectively, in the state where the operation key is moved until reaching the rim of the opening section, the pointing device generates the control signal corresponding to the slid distance of the operation key by:

determining a strength of the control signal as zero in the case where the operation key is located within a circular area whose center is located at the original point and whose radius is n/N of the `max_max` (n and N are arbitrary positive integers, and $n < N$);

determining a strength of the control signal corresponding to the slid distance of the operation key on the basis of a predetermined rule of operation in the case where the operation key is located within a toric area whose distance from the original point is larger than n/N of the `max_max` and smaller than the `min_max`; or

25 determining a strength of the control signal corresponding to a strength obtained when a slid distance of the operation key is the min _max in the case where the operation key is located within an area whose distance from the original point is larger than the min _max; and

a display position of a controlled object displayed on the display section is changed on the basis of the control signal.

42. An electronic apparatus as claimed in claim 41, comprising a plurality of rules of operations for transforming the slid distance of the operation key into the strength of the control signal.

43. An electronic apparatus as claimed in claim 41, wherein: the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the strength of the control signal to the slid distance of the operation key.

44. An electronic apparatus as claimed in claim 42, wherein: the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the strength of the control signal to the slid distance of the operation key.

45. An electronic apparatus comprising a pointing device for detecting a slid distance and a slid direction of an operation key located approximately at the center of an opening section, generating signal strength information on the basis of the slid distance of the operation key,

5 and generating a control signal corresponding to the signal strength information and the slid direction of the operation key, and a display section for displaying information, wherein:

10 when an original point is defined as a point where a slid distance of the operation key is zero, and a maximum value and a minimum value are defined as `max_max` and `min_max`, respectively, in the state where the operation key is moved until reaching the rim of the opening section, the pointing device generates:

15 signal strength information for determining a strength of the control signal as zero in the case where the operation key is located within a circular area whose center is located at the original point and whose radius is n/N of the `max_max` (n and N are arbitrary positive integers, and $n < N$);

20 signal strength information on the basis of a predetermined rule of operation so that a strength of the control signal corresponds to the slid distance of the operation key in the case where the operation key is located within a toric area whose distance from the original point is larger than n/N of the `max_max` and smaller than the `min_max`; or

25 signal strength information for determining a strength of the control signal so as to be identical to the strength when a slid distance of the operation key is the `min_max` in the case where the operation key is located within an area whose distance from the original point is larger than the `min_max`; and

30 a strength of the control signal is fixed regardless of a slid direction of the operation key when the operation key is located at the position where a distance from the original point is the `min_max`; and

a display position of a controlled object displayed on the display section is changed on the basis of the control signal.

46. An electronic apparatus as claimed in claim 45, comprising a plurality of rules of operations for transforming the slid distance of the operation key into the signal strength information.

47. An electronic apparatus as claimed in claim 45, wherein: the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the signal strength information to the slid distance of the operation key.

48. An electronic apparatus as claimed in claim 46, wherein: the toric area is divided into a plurality of subareas by setting at least one circular arc as a boundary whose center is the original point; and

5 the respective subareas have different variations of the signal strength information to the slid distance of the operation key.

49. An electronic apparatus as claimed in claim 41, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

50. An electronic apparatus as claimed in claim 42, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the

operation key according to the temperature.

51. An electronic apparatus as claimed in claim 43, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

52. An electronic apparatus as claimed in claim 44, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

53. An electronic apparatus as claimed in claim 45, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

54. An electronic apparatus as claimed in claim 46, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

55. An electronic apparatus as claimed in claim 47, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

56. An electronic apparatus as claimed in claim 48, further comprising:

a section for measuring a temperature of an environment where the pointing device is used; and

5 a section for correcting the detected slid distance of the operation key according to the temperature.

57. An electronic apparatus as claimed in claim 41, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the \max_max (m is an arbitrary positive integer, and $m < N$).

58. An electronic apparatus as claimed in claim 42, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N

of the max _max (m is an arbitrary positive integer, and m < N).

59. An electronic apparatus as claimed in claim 43, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and m < N).

60. An electronic apparatus as claimed in claim 44, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and m < N).

61. An electronic apparatus as claimed in claim 45, further comprising:

a push switch for detecting a push of the operation key, wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and m < N).

62. An electronic apparatus as claimed in claim 46, further

comprising:

a push switch for detecting a push of the operation key,
wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and $m < N$).

63. An electronic apparatus as claimed in claim 47, further comprising:

a push switch for detecting a push of the operation key,
wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and $m < N$).

64. An electronic apparatus as claimed in claim 48, further comprising:

a push switch for detecting a push of the operation key,
wherein:

5 the pointing device disables the push of the operation key detected by the push switch when the operation key is located outside a circular area whose center is the original point and whose radius is m/N of the max _max (m is an arbitrary positive integer, and $m < N$).

65. An electronic apparatus as claimed in claim 41, wherein:

the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

the pointing device detects the slid direction and the slid

5 distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

66. An electronic apparatus as claimed in claim 42, wherein:
the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

67. An electronic apparatus as claimed in claim 43, wherein:
the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

68. An electronic apparatus as claimed in claim 44, wherein:
the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

69. An electronic apparatus as claimed in claim 45, wherein:
the operation key is provided with a plurality of hall elements in the vicinity of the opening section; and

5 distance of the operation key on the basis of magnetic flux density detected by the respective hall elements.

70. An electronic apparatus as claimed in claim 46, wherein:
the operation key is provided with a plurality of hall elements
in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid
distance of the operation key on the basis of magnetic flux density
detected by the respective hall elements.

71. An electronic apparatus as claimed in claim 47, wherein:
the operation key is provided with a plurality of hall elements
in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid
distance of the operation key on the basis of magnetic flux density
detected by the respective hall elements.

72. An electronic apparatus as claimed in claim 48, wherein:
the operation key is provided with a plurality of hall elements
in the vicinity of the opening section; and

5 the pointing device detects the slid direction and the slid
distance of the operation key on the basis of magnetic flux density
detected by the respective hall elements.

73. An electronic apparatus as claimed in claim 41, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for
the control signal.

74. An electronic apparatus as claimed in claim 42, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for
the control signal.

75. An electronic apparatus as claimed in claim 43, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for
the control signal.

76. An electronic apparatus as claimed in claim 44, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for
the control signal.

77. An electronic apparatus as claimed in claim 45, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for

the control signal.

78. An electronic apparatus as claimed in claim 46, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for
the control signal.

79. An electronic apparatus as claimed in claim 47, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for
the control signal.

80. An electronic apparatus as claimed in claim 48, wherein:
when the slid distance and the slid direction of the operation
key is expressed in a coordinate system different from a coordinate
system used for a control signal, the pointing device converts the slid
5 distance and the slid direction of the operation key into a slid distance
and a slid direction expressed in the same coordinate system as used for
the control signal.